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Dear Reader

We are pleased that you have received a copy of this National Cancer Institute booklet. We hope you find it helpful.

We are always trying to improve our publications. The best way we can do this is by getting your reactions. At the end of this booklet, you will find a response card asking several questions. We would greatly appreciate your taking the time to fill out this card and returning it to us.

All of your responses will be treated confidentially. We welcome any other comments you may have.

Thanks in advance,

Office of Cancer Communications
National Cancer Institute
National Institutes of Health

Each year in the United States, almost 180,000 women are told that they have breast cancer.

Upon hearing this unexpected and overwhelming news, a woman is faced with having to make treatment choices within a short period of time.

This booklet can help her and her family understand what the diagnosis means and why treatment is necessary. It suggests questions to ask the doctor and identifies other resources for more information.

With this knowledge, a newly diagnosed breast cancer patient can more confidently participate with her doctor in planning the best possible treatment.

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About Breast Cancer

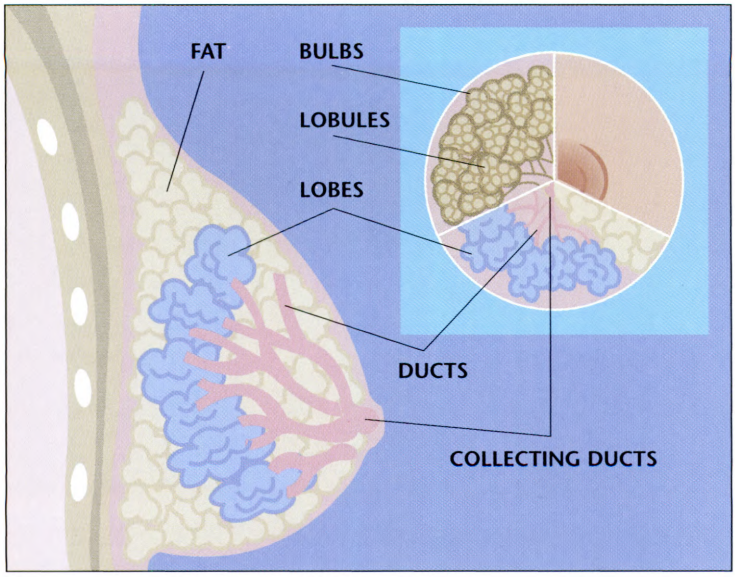
What Is Cancer?

Cancer is a group of more than 100 different diseases. Cancer occurs when, for unknown reasons, **cells** become **abnormal** and divide without control or order. All parts of the body are made up of cells that normally divide to produce more cells only when the body needs them. When cancer occurs, cells keep dividing even when new cells are not needed.

The change from normal to cancerous cells requires several separate, different **gene alterations.** Eventually, altered genes and uncontrolled growth may produce a **tumor** that can be **benign** (not cancer) or **malignant** (cancer). Malignant tumors can invade, damage, and destroy nearby **tissues** and spread to other parts of the body. A benign tumor won't spread to other parts of the body, but local tissue may be damaged and the growth may need to be removed.

To learn more about breast lumps and other breast changes, read NCI's booklet ***Understanding Breast Changes: A Health Guide for All Women,*** *available from the Cancer Information Service. It includes information about many breast changes that are not cancer and explains the procedures used to discover the presence of breast cancer.*

Types of Breast Cancer



There are several types of breast cancer. The most common is **ductal carcinoma**, which begins in the lining of the milk **ducts** of the breast. Another type, **lobular carcinoma**, begins in the **lobules** where breast milk is produced. If a malignant tumor invades nearby tissue, it is known as **infiltrating** or **invasive** cancer.

How Cancer Spreads

A malignant tumor can invade surrounding tissue and destroy it. Cancer cells can also break away from a malignant tumor and enter the bloodstream or the **lymphatic system.** This is how cancer spreads within the body. When breast cancer spreads outside the breast, cancer cells often

are found in the **lymph nodes** under the arm. Cancer cells may spread beyond the breast such as to other lymph nodes, the bones, liver, or lungs. (Although it is not common, some patients whose underarm lymph nodes are clear of breast cancer may still have cancer cells which have spread to other parts of the body.)

Cancer that spreads to other parts of the body is the same disease and has the same name as the original cancer. When breast cancer spreads, it is called **metastatic** breast cancer even though it is found in another part of the body. For example, breast cancer that has spread to the bones is called metastatic breast cancer, not bone cancer.

What Causes Breast Cancer?

Medical researchers are learning about what happens inside cells that may cause cancer. They have identified changes in certain **genes** within breast cells that can be linked to a higher risk for breast cancer. Breast cells contain a variety of genes that normally work cooperatively with a woman's natural **hormones**, diet, and environment to keep her breasts healthy. Certain genes routinely keep breast cells from dividing and growing out of control and forming tumors. When these genes become altered, changes occur and a cell no longer can grow correctly.

Genetic changes may be inherited from a parent or may accumulate throughout a person's lifetime. Breast cancer usually begins in a single cell that changes from normal to malignant over a period of time. Presently, no one can predict exactly when cancer will occur or how it will progress. When breast cancer is diagnosed — even if detected at the earliest **stage** — it is not yet possible to

predict which cancer cells will be treated successfully and which will continue to grow and spread quickly to other parts of the body.

What is known:

- You should not feel guilty. You haven't done anything wrong in your life that caused breast cancer.
- You cannot "catch" breast cancer from other women who have the disease. It is not contagious.
- Breast cancer is not caused by stress or by an injury to the breast.
- Most women who develop breast cancer do not have any known **risk factors** or a history of the disease in their families.

Who Gets Breast Cancer?

Every woman has some chance of developing breast cancer during her lifetime. As women get older, their chances increase. Breast cancer is the most frequently diagnosed cancer in women in the United States today, other than skin cancer. Even though breast cancer is more common in older women, it also occurs in younger women and even in a small number of men.

Gene Testing

Medical researchers are now able to look within cells, and are making new discoveries that explain how genes are related to cancer and other diseases. They have identified specific genes linked to breast cancer and other cancers that run in families. Tests are becoming available for women and family members who choose to find out if they have inherited the genetic changes that increase their risk for cancer. There is still much uncertainty involved with gene testing. If you or your family members are considering testing, your doctor or a genetics counselor can give you guidance and help you make an informed decision. It's important to consider carefully the benefits, risks, limitations, and the far-reaching consequences of gene testing.

For more information and answers to frequently asked questions about gene testing, read ***Understanding Gene Testing*** *and* ***Genetic Testing for Breast Cancer Risk: It's Your Choice.*** *These booklets are available from NCI's Cancer Information Service.*

Making a Decision About Treatment

The only way to find out for sure if a breast lump or abnormal tissue is cancer is by having a **biopsy.** The suspicious tissue that is removed by a **surgeon** or **radiologist** during a biopsy is examined under a microscope by a **pathologist** who makes the diagnosis. If your biopsy result is **positive**, it means that the tumor or tissue from the suspicious area contains cancer and you will need treatment. Information on the following pages can help you understand the various treatments that are available and decide what is best for you. It is safe to begin treatment up to several weeks after diagnosis. This gives you time to:

- Have a complete study of your breast tissue and tests of other parts of your body.
- Get other opinions about your diagnosis and the suggested treatment plan.
- Talk with each of the specialists who will be on your treatment team. (See page 21.)
- Call your health insurance plan before treatment begins.
- Call NCI's Cancer Information Service at 1-800-4-CANCER for the most up-to-date, accurate breast cancer treatment information. (See page 69.)

- Contact breast cancer organizations to find support groups near you.
- Talk with other women who have had breast cancer and have gone through treatment.
- Prepare yourself and loved ones for your treatment.

Remember, you don't have to face breast cancer alone — there are knowledgeable and caring people who can help you.

Are All Breast Cancers Alike?

Breast cancer is a complex disease. All cases are not the same. Once breast cancer has been found, more tests will be done to find out the specific pattern (description) of your disease. This important step is called **staging.** The chart on page 13 explains the stages. Knowing the exact **stage** of your disease will help your doctor plan your treatment. Your doctor will want to know:

- The size of the tumor and exactly where it is in your breast.
- If the cancer has spread within your breast.
- If cancer is present in your lymph nodes under your arm.
- If cancer is present in other parts of your body.

STAGING — Specific Patterns of Breast Cancer

Stage 0	Very early breast cancer. This type of cancer has not spread within or outside the breast. It is sometimes called **DCIS**, **LCIS**, or **breast cancer *in situ*** or noninvasive cancer. (See page 15.)
Stage I	The cancer is no larger than about 1 inch in size and has not spread outside the breast. (Also described as early breast cancer.)
Stage II	The doctor may find any of the following: • The cancer is no larger than 1 inch, but has spread to the lymph nodes under the arm. • The cancer is between 1 and 2 inches. It may or may not have spread to the lymph nodes under the arm. • The cancer is larger than 2 inches, but has not spread to the lymph nodes under the arm.
Stage III **Stage IIIA**	Stage III is divided into stages IIIA and IIIB: The doctor may find either of the following: • The cancer is smaller than 2 inches and has spread to the lymph nodes under the arm. The cancer also is spreading further to other lymph nodes. • The cancer is larger than 2 inches and has spread to the lymph nodes under the arm.

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STAGING — Specific Patterns of Breast Cancer

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Stage IIIB

The doctor may find either of the following:

- The cancer has spread to tissues near the breast (skin, chest wall, including the ribs and the muscles in the chest).
- The cancer has spread to lymph nodes inside the chest wall along the breast bone.

Stage IV

The cancer has spread to other parts of the body, most often the bones, lungs, liver, or brain. Or, the tumor has spread locally to the skin and lymph nodes inside the neck, near the collarbone.

Inflammatory Breast Cancer

Inflammatory breast cancer is a rare, but very serious, aggressive type of breast cancer. The breast may look red and feel warm. You may see ridges, welts, or hives on your breast; or the skin may look wrinkled. It is sometimes misdiagnosed as a simple infection.

Recurrent Breast Cancer

Recurrent disease means that the cancer has come back (recurred) after it has been treated. It may come back in the breast, in the soft tissues of the chest (the chest wall), or in another part of the body.

(Tumor size is usually reported in metric measurement: 1 centimeter = approximately 1/2 inch.)

Breast Cancer in situ — DCIS and LCIS

Many breast cancers being found are very early cancers known as breast cancer *in situ* or noninvasive cancer. Most of these cancers are found by **mammography.** These very early cell changes may become **invasive breast cancer.** Two types of breast cancer *in situ* are:

DCIS (ductal carcinoma *in situ*), which means that abnormal cells are found only in the lining of a milk duct of the breast. These abnormal cells have not spread outside the duct. They have not spread within the breast, beyond the breast, to the lymph nodes under the arm, or to other parts of the body. There are several types of DCIS. If not removed, some types may change over time and become invasive cancers. Some may never become invasive cancers. (DCIS is sometimes called **intraductal carcinoma.**)

LCIS (lobular carcinoma *in situ*), which means that abnormal cells are found in the lining of a milk lobule. Although LCIS is not considered to be actual breast cancer at this noninvasive stage, it is a warning sign of increased risk of developing invasive cancer. LCIS is sometimes found when a biopsy is done for another lump or unusual change that is found on a **mammogram.** Patients with LCIS have a 25 percent chance of developing breast cancer in either breast during the next 25 years.

Microcalcifications are very small specks of calcium that can't be felt, but can be seen on a **mammogram.** They are formed by rapidly dividing cells. When they are clustered in one area of the breast, this could be an early sign of breast cancer *in situ.* About half of the breast cancers found by mammography appear as clusters of microcalcifications. The other half appear as lumps.

To be sure that you have a correct diagnosis if breast cancer *in situ* is detected, an experienced pathologist should examine your biopsy slides. You may want to have your slides examined also by a second pathologist at a university hospital, cancer center, or breast clinic. This is important because it is sometimes difficult to make an accurate diagnosis. The pathologist needs to determine the types of cells that are present in the tissue sample, how fast the cells are changing, and whether it is likely to become invasive cancer. The diagnosis will help your doctor decide on the appropriate treatment from a wide range of choices. The decision could be to have frequent followup exams to watch the suspicious area, or **surgery** to remove only the affected tissue, or surgery to remove one or both breasts. Surgery removing only the affected area is sometimes followed by **radiation therapy** to the breast.

For more information about breast cancer in situ:

- *Talk with your doctor.*
- *Get as many expert opinions as you need to feel confident in the accuracy of your diagnosis.*
- *Call the NCI's Cancer Information Service at 1-800-4-CANCER.*

Prognosis (Chance of Recovery)

Most women who are treated for early breast cancer go on to live healthy, active lives. You may have more choices of treatment if your breast cancer is found early.

Treatments have changed over time. Today, many women who are diagnosed with breast cancer do not have to lose a breast. Because there are improved ways to treat breast cancer, it is more important than ever for you to learn all you can. Working with your team of medical specialists, you can play a key role in choosing the treatment that is best for you.

Once your doctor has determined your specific type and stage of breast cancer, you can begin to plan for your treatment and recovery. Your chance of recovery will depend on many factors, including:

- The type and stage of your cancer (what kind of cancer; the size of the tumor; and whether it is only in your breast, or has spread to any lymph nodes or to other parts of your body).
- How fast the cancer is growing. Special lab tests on the tissue can measure how fast the cancer cells are dividing and how different they are compared to normal breast cells.
- How much the breast cancer cells depend on female hormones (**estrogen** and **progesterone**) for growth which can be measured by **hormone receptor tests.** Patients whose tumors are found to be dependent on hormones (described as estrogen-positive or progesterone-positive) can be treated by **hormonal therapy** to prevent further growth or recurrence of breast cancer. (See page 45.)

- Your age and menopausal status (whether or not you still have monthly menstrual periods).
- Your general state of health.

Risk Factors for Recurrence

Your chance of surviving breast cancer will also depend upon your risk for return of cancer after treatment is completed. Some women are at higher risk for the spread or return of breast cancer. In many cases, doctors can't explain why one patient stays well and another does not. Remember, the risk factors for recurrence are complex. They are not absolute predictions of your future health. Some factors that affect the spread or the recurrence of breast cancer are:

- Tumor size: The smaller your tumor, the lower the risk.
- Lymph nodes: The fewer underarm lymph nodes that have cancer, the lower your risk.
- Cell growth: Cancer cells that grow slowly are linked to a lower risk.
- Hormones: If a tumor depends on hormones for growth, hormonal therapy can lower the risk of cancer spread or recurrence.

Questions To Ask Your Doctor After a Biopsy

- *Please explain what is on the **pathology report.***
- *What type of breast cancer do I have? What stage of breast cancer do I have?*
- *Did a pathologist who is experienced in diagnosing breast cancer examine my biopsy slides?*
- *Should my biopsy slides be examined again? Why or why not?*
- *What are the chances that the cancer has spread within or outside my breast?*
- *Were lab tests done on the tumor tissue? What do the results mean for me?*
- *Were estrogen and **progesterone receptor tests** done? What do the results mean for me? (See page 45.)*
- *What other tests do I need? (Chest **x-ray,** bone scan, etc.)*
- *What are my treatment choices? How can I get more information about them?*

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Questions to Ask Your Doctor After a Biopsy

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- *What benefit can I expect from each kind of treatment?*
- *What are the risks and possible side effects of each treatment? Short-term? Long-term?*
- *What are the risks if I don't get treatment?*
- *What are my chances for recurrence?*
- *How can I get another opinion?*
- *Did you check NCI's **PDQ**® database for physicians to get the latest information about my type and stage of breast cancer? (See page 69.)*
- *Is there any research being done on my kind of cancer? Did you check NCI's Web site for clinical trials on the Internet at **http://cancertrials.nci.nih.gov**?*

Your Treatment Team

Once your doctor has all the specific information about your breast cancer, you will talk about all the treatments considered appropriate for your case. No one doctor is able to provide all the care and services you may need, and you will quickly learn about new people who will be on your treatment team. Some of the medical experts who may be part of your treatment team are:

Anesthesiologist: a doctor who gives drugs or gases that keep you comfortable during surgery.

Gynecologist: A doctor who specializes in the care and treatment of women's reproductive systems. This doctor or your **primary care doctor** can serve as the manager and main source of information among your treatment team members and you.

Nutritionist or **dietitian:** a health professional with specialized training in nutrition who can offer help and choices about the foods you eat.

Oncologist, medical oncologist, or **cancer specialist:** a doctor who uses **chemotherapy** or hormonal therapy to treat cancer. This specialist can put together all the information about your case and can discuss your treatment choices with you.

Oncology nurse: a nurse with special training in caring for cancer patients. You may also receive care from a **clinical nurse specialist** or **nurse practitioner.**

Oncology pharmacy specialist: a person who prepares anticancer drugs in consultation with the oncologist and can answer your questions about chemotherapy.

Pathologist: a doctor who examines tissues and cells under a microscope to determine if they are normal or abnormal.

Physical therapist: a health professional who teaches exercises that help restore arm and shoulder movement and build back strength after breast cancer surgery.

Plastic surgeon or **reconstructive surgeon:** a doctor who can surgically rebuild (reconstruct) your breast.

Primary care doctor: the doctor who usually manages your health care and can discuss cancer treatment choices with you.

Psychologist: a specialist who can talk with you and your family about emotional and personal matters, and can help you make decisions.

Radiation oncologist: a doctor who uses radiation therapy to treat cancer.

Radiation therapist: a health professional who gives radiation treatments.

Radiologist: a doctor with special training in reading **x-rays** and performing specialized x-ray procedures.

Social worker: a professional who can talk with you and your family about your emotional or physical needs and can help you find support services. An **oncology social worker** has specific training in working with cancer patients.

Surgeon or **surgical oncologist:** a doctor who performs biopsies and other surgical procedures such as removing a lump **(lumpectomy)** or a breast **(mastectomy).**

A Second Opinion

Once you receive your doctor's opinion about what treatments you need, you have the right to get more advice before you make up your mind. Other doctors' opinions can help you make one of the most important decisions of your life. Getting another doctor's advice is normal medical practice, and your doctor can help you with this effort. Many health insurance companies require and will pay for other opinions. Another opinion can help you:

- *Confirm or adjust your treatment plan based on the diagnosis and stage of the disease.*
- *Get answers to your questions and concerns and help you become comfortable with your decisions.*
- *Decide about taking part in a research study of new breast cancer treatment methods.* *(See Clinical Trials, page 26.)*

To get a second opinion:

- *Ask your doctor to refer you to another breast cancer specialist who is not already on your treatment team. Take along your mammogram films, biopsy slides,* ***pathology report,*** *and proposed treatment plan when you see this doctor.*
- *Call the NCI's Cancer Information Service (1-800-4-CANCER) for help in locating cancer centers that may be in your area.*
- *Talk with women in breast cancer organizations, cancer survivor groups, or other women who have been through breast cancer treatment. Keep in mind, however, that all breast cancer cases are not the same. Individual experiences and treatments may be different.*

Treatment Options

Today, most women with breast cancer are diagnosed at an early stage and they benefit from newer, more effective treatments. There are treatments available for patients at all stages of breast cancer. Often, more than one type of treatment is needed. The treatments used today are listed below and described in more detail later in this booklet.

- **Surgery:** taking out the cancer in an operation. (See page 27.)
- **Radiation therapy:** using high-dose x-rays to kill cancer cells or keep them from dividing and growing. (See page 35.)
- **Chemotherapy:** using anticancer drugs to kill or stop the growth of cancer cells. (See page 38.)
- **High-dose chemotherapy:** using high doses of anti-cancer drugs to kill cancer cells. High-dose drug treatments with peripheral **stem cell** transplantation and **bone marrow** transplantation are being tested in **clinical trials.** (See page 43.)
- **Hormonal therapy:** using hormones to stop cancer cells from growing. (See page 45.)
- **Biological therapy (immunotherapy):** using the **immune system** to fight cancer or to lessen the side effects that may be caused by some cancer treatments. Many biological therapies are being tested in clinical trials. (See page 48.)

Clinical Trials

Your doctor may suggest that you consider taking part in a breast cancer treatment clinical trial, where patients help scientists find new, improved treatments for cancer. You may want to ask your doctor if you should consider joining such a research study. It's important to make this decision *before you start treatment* because you may not be eligible if you have had certain treatments already. Every successful treatment used today started as a clinical trial, and the patients who participated were the first to benefit from improved therapy.

Research studies for breast cancer treatments take place in many hospitals and cancer centers across the country. In these clinical trials, doctors use the newest treatments to care for cancer patients. Each carefully planned study is designed to answer certain questions and to find out specific information about how well a new drug or treatment method works. All new treatments must go through three steps or "phases" of clinical trials:

Phase 1: Tests the best way to give a new treatment and how much can be given safely.

Phase 2: Finds out how well a treatment destroys cancer cells.

Phase 3: Compares two or more different treatments.

Each phase depends and builds on information from earlier phases. As time goes on, new and better ways to help cancer patients are being developed. It takes time, often several years, for clinical trials to prove the true value and effectiveness of a new treatment. All clinical-study patients receive the best care possible, and their reactions

to the treatment are watched very closely. If the treatment doesn't seem to be helping, a doctor can take a patient out of a study. Also, a patient may choose to leave at any time. If a patient leaves a research study for any reason, **standard** care and treatment are still available.

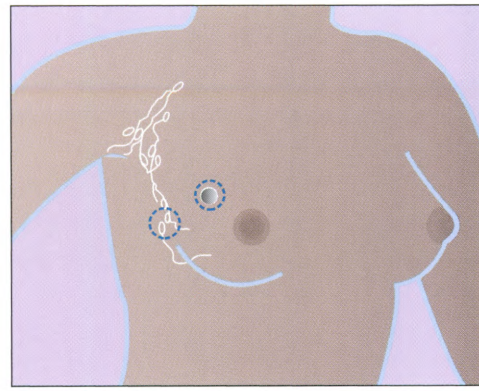
If you are thinking about joining a breast cancer treatment clinical trial, your doctor can give you information that will help you decide if the choice is right for you. You should consider carefully what is involved and all possible benefits and risks of the treatment that is being offered.

To learn more about cancer treatment clinical trials, call NCI's Cancer Information Service at 1-800-4-CANCER. A cancer information specialist can answer your questions and send you NCI's booklet, ***Taking Part in Clinical Trials: What Cancer Patients Need To Know.***

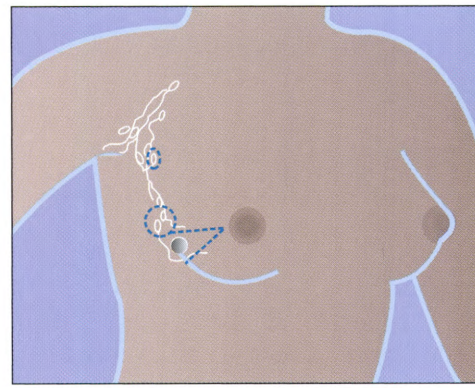
Surgery

Surgery has an important role in the treatment of patients with breast cancer. Most women can choose between breast-conserving surgery (lumpectomy with radiation therapy) or removal of the breast (mastectomy). Clinical trials have proven that both options provide the same long-term survival rates for most types of early breast cancer. However, neither option guarantees that cancer will not recur. Whichever choice you make, you will need close medical followup for the rest of your life.

Breast Conserving Surgery



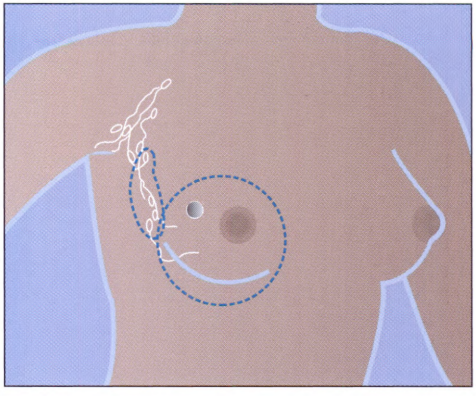
Lumpectomy:
The surgeon removes the breast cancer and some normal tissue around it (in order to get **clear margins**). This procedure usually results in removing all the cancer, while leaving you with a breast that looks much the same as it did before surgery. Usually, the surgeon also takes out some of the lymph nodes under the arm to find out if the cancer has spread. Women who have lumpectomies almost always have radiation therapy as well. Radiation therapy is used to destroy any cancer cells that may not have been removed by surgery.
(See page 35.)



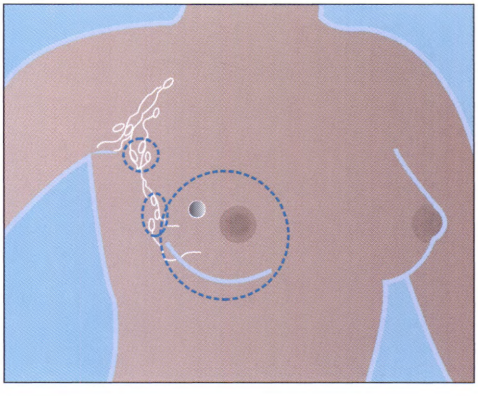
Partial or segmental mastectomy:
Depending on the size and location of the cancer, this surgery can conserve much of the breast. The surgeon removes the cancer, some of the breast tissue, the lining over the chest muscles below the tumor, and usually some of the lymph nodes under the arm. In most cases, radiation therapy follows.

Mastectomy

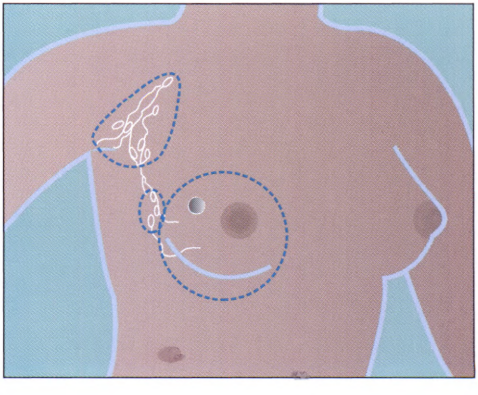
Total (or simple) mastectomy:
The surgeon removes the entire breast. Some lymph nodes under the arm may be removed, also.



Modified radical mastectomy:
The surgeon removes the breast, some of the lymph nodes under the arm, and the lining over the chest muscles, and sometimes part of the chest wall muscles.



Radical mastectomy:
The surgeon removes the breast, chest muscles, and all the lymph nodes under the arm. This was the standard operation for many years, but it is used now only when a tumor has spread to the chest muscles.



A mastectomy may be recommended when:

- Cancer is found in more than one part of the breast.
- The breast is small or shaped so that a lumpectomy would leave little breast tissue or a very deformed breast.
- A woman chooses not to have radiation therapy.
- A woman prefers a mastectomy.

Possible Problems: As in any kind of surgery, there is a risk of infection, poor wound healing, bleeding, or a reaction to the **anesthesia** used in surgery. There may be a collection of fluid under the skin; or tingling, numbness, stiffness, weakness, or swelling of the arm (See **lymphedema**, page 32). Physical therapy and exercise can help to restore arm movement and strength.

After a mastectomy, a woman may choose to:

- Wear a breast form, called a **prosthesis**, that fits in her bra. To find stores that have breast forms and fitters, talk with your doctor, nurse, or a volunteer from the American Cancer Society Reach for Recovery program or other breast cancer organization, or other women who have had breast cancer.
- Have her breast reconstructed by a plastic surgeon.
- Do neither.

Some health insurance plans pay for all or part of the costs of a prosthesis or for breast reconstruction. However, there may be health insurance rules about where a woman can have breast reconstruction surgery or where to buy a prosthesis. For details about your health plan coverage, contact your insurance company.

Questions To Ask Your Surgeon Before Surgery

- *What kind of surgery do you recommend for me?*
- *How much of my breast will be removed?*
- *If I have a mastectomy, will I be able to have breast reconstruction?* *(See page 49.)*
- *Do you recommend it at the time of surgery or later? Will I meet with the plastic surgeon before surgery?*
- *Will you remove any of my lymph nodes?*
- *Where will the operation be done? Will I have local or general anesthesia?*
- *How should I feel after the operation? If I have pain, how can I get relief?*
- *What side effects should I report to you?*
- *Where will the scars be? What will they look like?*
- *Will a nurse or physical therapist teach me how to exercise and care for my arm?*
- *How long will I stay in the hospital? Will I need followup care?*
- *When can I get back to my normal activities? What activities should I avoid?*
- *What do I need to do to prepare for surgery?*

Removal of Lymph Nodes

Whether you have a lumpectomy or mastectomy, your surgeon will probably remove some of the lymph nodes under your arm. This procedure is usually done at the same time as the breast surgery to check if the cancer has spread outside the breast. Clear lymph nodes are reported as **negative** nodes. If cancer is found, you have positive nodes. Your doctor will talk with you about any additional treatments needed to destroy and control cancer cells.

Lymphedema

The lymph nodes under your arm drain lymph fluid from your chest and arm. Both surgery and radiation therapy can change the normal drainage pattern. This can result in a swelling of the arm called lymphedema. The problem can develop right after surgery or months to years later.

Treatment of lymphedema depends on how serious the problem becomes. Options include an elastic sleeve, an arm pump, arm massage, and bandaging the arm. Exercise and diet also are important. If you have this problem, talk with your doctor and see a physical therapist as soon as possible. Many hospitals and breast clinics offer help with lymphedema. There is no cure for this condition, so you should do what you can to prevent it.

Sentinel Lymph Node Biopsy

Surgeons are investigating a new procedure in cancer patients used to detect lymph node involvement. In this

procedure, either a blue dye or a small amount of radioactive material is injected around the tumor site. The surgeon performs a small incision in the axillary underarm area looking for a lymph node containing the blue dye or uses a scanner to locate the radioactive material. The lymph node(s) where the dye first accumulates after leaving the tumor region is called the "**sentinel** node(s)." This node(s) is then surgically removed and examined by a pathologist. If it is positive for cancer cells, then the rest of the nodes are usually removed; if it is negative, the remaining lymph nodes may not have to be removed.

After underarm lymph nodes are removed, your arm will have to be protected for the rest of your life.

To help prevent or control lymphedema and to protect your arm after treatment:

- *Carry packages or handbags on the other arm or shoulder.*
- *Avoid sunburns and burns to your affected arm and hand.*
- *Have shots (including chemotherapy), blood draws, and blood pressure tests done on the other arm.*
- *Avoid cuts when shaving underarms; use an electric shaver.*
- *Wash cuts promptly, apply antibacterial medication, and cover with a bandage. Call your doctor if you think that you have an infection.*
- *Wear gloves to protect your hands when gardening and when using strong detergents.*
- *Avoid wearing tight jewelry on your affected arm; avoid elastic cuffs on blouses and nightgowns.*
- *Have careful manicures; avoid cutting your cuticles.*

Questions To Ask Your Surgeon After Surgery

- *What did you learn from the pathology report? Please explain what is in the pathology report.*
- *How many lymph nodes were removed? Were they free of cancer? If not, how many showed signs of cancer?*
- *Did the tumor have clear margins (normal tissue around the tumor)?*
- *Were hormone receptor tests done? What are the results?* *(See page 45.)*
- *What other tests will be done on the tissue? When will I know the results?*
- *Do I need further treatment?*
- *Should I consider joining a clinical trial?*

Radiation Therapy

A lumpectomy usually is followed by radiation therapy. During radiation therapy, high-energy x-rays are used to destroy cancer cells that still may be present in the affected breast or in nearby lymph nodes. Radiation therapy is sometimes used to shrink tumors before surgery. Doctors sometimes use radiation therapy along with chemotherapy, before or instead of surgery, to destroy cancer cells and shrink tumors.

Radiation Therapy After Lumpectomy

In radiation therapy after a lumpectomy, a machine delivers radiation to the affected breast and, in some cases, to the lymph nodes under the arm or at the collarbone **(clavicle)**. The usual schedule for radiation therapy is 5 days a week for 5 to 6 weeks. The actual treatment, given by a radiation therapist, takes only a few minutes each day. Sometimes an additional "boost" or higher dose of radiation is given to the area where the cancer was found.

During your first visit for radiation treatment planning, your chest area will be marked with ink or with a few long-lasting tattoos. These marks must stay on your skin during the entire treatment period because they show exactly where the radiation will be given. Your radiation oncologist will plan your specific treatment based on a physical exam, mammograms, pathology and lab reports, and your medical history. Doctors carefully limit both the intensity of each treatment and the area being treated so that the least amount of normal tissue will be affected. Throughout your therapy, your radiation oncologist will check on the effects of your treatment, and you will have regular physical exams and blood tests to check your general health.

To get the full benefit from radiation therapy, you need to complete all your treatments as scheduled.

Possible Problems: Feeling more tired than usual; skin problems such as itchiness, redness, soreness, peeling, darkening, or shininess of the skin; or decreased sensation in the breast. Radiation to the breast does not cause hair loss, vomiting, or diarrhea.

Long-term changes may include changes in the shape and color of the treated breast or a feeling of heaviness in the breast. Once a breast has been irradiated, it cannot be irradiated again. Any local recurrence or new tumor would have to be treated by mastectomy.

Radiation Therapy After Mastectomy

There are times when radiation therapy is used after a mastectomy. It may be used if:

- The tumor is larger than 2 inches.
- Cancer is found in many lymph nodes under the arm.
- The tumor is close to the rib cage or chest wall muscles.

For more information about what to expect and how to care for yourself during radiation therapy, see NCI's booklet, ***Radiation Therapy and You: A Guide to Self-Help During Treatment.***

Questions To Ask Your Radiation Oncologist

You will have time during your radiation treatment planning session and the daily treatments to ask questions and talk about your concerns. You may want to ask:

- *What benefit will I get from radiation therapy? What are the side effects? What are the risks?*
- *When will my treatment begin? What is the schedule? When will treatment end?*
- *What should I do to prepare for each treatment?*
- *Who will give the actual radiation treatment? How long will each session take?*
- *What will happen during each treatment? Will I feel anything?*
- *How do I care for myself during the weeks of therapy? What side effects should I report to you?*
- *How will we know the treatment is working successfully?*
- *How will my breast look and feel when radiation therapy is completed?*
- *Will I be able to drive to and from the radiation center alone? Are there any restrictions to my normal activities?*
- *How long will I have to protect the irradiated skin from the sun?*
- *Will I need followup care?*
- *What if I don't have radiation therapy?*

Chemotherapy

Research suggests that, even if a lump is small, cancer cells may have spread outside the breast. Doctors can use chemotherapy drugs to destroy cancer cells. Some chemotherapy drugs work better when combined with other chemotherapy drugs than when used alone.

The oncologist will recommend a treatment plan according to your individual case. The treatment will depend on your age, whether or not you still are having periods, the risk for spread or recurrence, and your general health. The drugs you take will depend on the type and stage of cancer, where it is located, how much or how fast it has grown, and how it is affecting you. Chemotherapy is used to:

- Decrease the chances that cancer will come back after breast cancer surgery.
- Shrink breast cancer before surgery, when the tumor is large or it is inflammatory cancer.
- Control the disease when breast cancer is found in the lungs, bones, liver, brain, or other parts of the body.

Chemotherapy drugs travel throughout the body to slow the growth of cancer cells or kill them. Often, the drugs are injected into the bloodstream through an **intravenous (IV)** needle that is inserted into a vein. Some drugs are given as pills. Treatment can be as short as a few months or as long as 2 years.

Chemotherapy is usually given in cycles during which you have treatment for a period of time, and then you have a few weeks to recover before your next treatment. Depending on the drugs you take, you may have your chemotherapy at home, in your doctor's office, in a clinic,

in a hospital's outpatient department, or in a hospital. How often and how long you have chemotherapy will depend on the type and stage of breast cancer, the drugs that are used and how your body responds to them, and the goals of the treatment. You should follow the schedule prescribed by your doctor.

Throughout chemotherapy, your oncologist and nurse will watch how you respond to the therapy. You will have frequent physical exams and blood tests. You should check with your doctor before taking any other medications during your treatment.

Chemotherapy affects all fast-growing cells throughout the body. Therefore, in addition to killing cancer cells, it also kills fast-growing normal cells. This is what may cause side effects such as hair loss, mouth sores, and fatigue. Today, because of what has been learned in research studies, doctors are able to control, lessen, or avoid many side effects of chemotherapy.

Possible Problems: Chemotherapy can cause short-term and long-term side effects that are different for each patient, depending on the drugs used.

The most common short-term side effects that may appear during chemotherapy include: loss of appetite, nausea, vomiting, diarrhea, constipation, fatigue, infections, bleeding, weight change, mouth sores, and throat soreness. Some of these problems may continue for some time after chemotherapy ends.

Some drugs cause short-term hair loss. Hair will grow back either during treatment or after treatment is completed. Before you start chemotherapy, you may want to have your hair cut short, or buy a wig, hat, or scarves that you can wear while you are going through treatment.

Serious long-term side effects may include weakening of your heart, damage to your **ovaries**, infertility, early **menopause**, or second cancers such as leukemia (cancer of the blood). These side effects may not appear until later, some time after chemotherapy is completed.

You can learn more about cancer chemotherapy by contacting NCI's Cancer Information Service at 1-800-4-CANCER to talk with a cancer information specialist. You can request helpful booklets such as ***Helping Yourself During Chemotherapy: 4 Steps for Patients*** *and* ***Chemotherapy and You: A Guide to Self-Help During Treatment,*** *which explain in more detail what to expect during treatment. They also include tips on how you can help take care of yourself and how to manage side effects. Another booklet,* ***Eating Hints for Cancer Patients,*** *contains helpful suggestions and recipes.*

Fighting Infections

You are more likely to get infections during chemotherapy, and your body is less able to fight infections during this time. You can help yourself stay healthy by following these steps:

- Finish dental work before starting chemotherapy. You cannot have dental work during chemotherapy.
- Eat a healthy diet and get plenty of rest.
- Stay away from large crowds and from anyone with a cold, infection, or contagious disease.
- Bathe daily, wash your hands often, and follow good mouth care.

- Wear work gloves to protect your hands against cuts and burns.
- If you cut yourself, keep the wound clean and covered. Talk with your doctor or nurse about applying antibiotics or medications.

Pregnancy

During chemotherapy, you may stop having monthly menstrual periods. You still can get pregnant, however, so talk with your doctor about birth control. The effect of chemotherapy on an unborn baby is unknown. After your treatment is over, your ability to get pregnant will depend on your age and the types of drugs you received. If you hope to become pregnant after treatment, talk with your doctor *before* starting chemotherapy.

Managing Nausea

Feeling nauseous, or as if you have to vomit, is a common side effect of chemotherapy. Your doctor can prescribe medication to help with this problem. Good nutrition is especially important during cancer treatment. The following suggestions may help:

- *Eat small meals often; do not eat 3 to 4 hours before your treatment.*
- *Eat whatever you can tolerate; for example, popsicles, gelatin desserts, cream of wheat, oatmeal, baked potatoes, and fruit juices mixed with water.*
- *Chew your food thoroughly and try to relax during meals.*
- *Learn stress reduction exercises such as relaxation, meditation, and deep breathing.*

Questions To Ask Your Medical Oncologist About Chemotherapy

- *Why do I need chemotherapy?*
- *What drugs do you recommend? How successful is this treatment for my type and stage of breast cancer?*
- *What are the benefits and risks of taking these drugs?*
- *Are there any research studies that I should consider?*
- *How will you and I be sure that the drugs are working?*
- *Where and how will I receive these drugs? Will someone stay with me during treatments?*
- *How many treatments will I need, and how long will I be on chemotherapy?*
- *What are the common side effects of these drugs and how can I manage them?*
- *What side effects should I report to you?*
- *Are there any restrictions? Will I be able to maintain my normal activities?*
- *How should I prepare for the treatment? Will I be able to drive home alone afterwards?*
- *Will there be long-term side effects? Will I need followup care?*
- *What if I choose not to have chemotherapy?*

High-Dose Chemotherapy

In breast cancer treatment clinical trials, researchers at NCI and other health institutions are testing high-dose chemotherapy to find out if it is better than standard chemotherapy. They are trying to learn if higher doses of drugs can prevent or delay the spread or return of breast cancer better than standard doses of drugs, and which type of treatment helps patients live longer.

Patients who receive high-dose chemotherapy are at great risk of suffering life-threatening side effects because the treatment damages their bone marrow and they no longer are able to produce needed blood cells. To help repair the damage done by high doses of drugs, the treatment includes peripheral blood stem cell transplantation and/or bone marrow transplantation.

Peripheral Blood Stem Cell Transplantation

Peripheral blood stem cell transplantation involves the removal of a certain type of blood cell (stem cell) from a patient's blood. Stem cells are immature cells from which all blood cells develop as they are needed. Stem cells are able to divide and form more stem cells (copies of themselves) or they can become fully mature red blood cells **(erythrocytes)**, **platelets**, and white blood cells **(leukocytes)**.

The removed stem cells are frozen and stored while the patient is treated with high-dose chemotherapy. After chemotherapy ends and the drugs are gone from the body, the stem cells are returned to the patient through a vein. The healthy stem cells can then begin to grow and produce all types of blood cells the patient needs to survive.

Bone Marrow Transplantation

Bone marrow is the sponge-like material found inside bones that produces blood cells. Autologous bone marrow transplantation is used in breast cancer treatment. In this procedure, some of a patient's own healthy bone marrow is removed with a needle before treatment begins. The bone marrow is then frozen and stored while the patient is treated with high-dose chemotherapy. Several days after the treatment ends and the drugs are gone from the body, the healthy bone marrow is given back to the patient through a vein. The healthy bone marrow can then begin to produce blood cells that the patient needs to survive. Peripheral blood stem cells and bone marrow transplantation may be used together as part of high-dose chemotherapy.

It hasn't been proven yet whether high-dose chemotherapy is better than standard chemotherapy, or which breast cancer patients need this treatment. It is best to have high-dose chemotherapy at an established transplant

center or medical institution conducting a clinical trial. Some health insurance plans pay for some of the costs of peripheral blood stem cell or bone marrow transplantation.

Possible Problems: There are major risks involved with high-dose chemotherapy. Talk with your doctor about possible complications and severe side effects, and whether this would be an appropriate treatment for your type and stage of breast cancer.

You can learn more about breast cancer treatment clinical trials that use high-dose chemotherapy, peripheral blood stem cell transplantation, and bone marrow transplantation. By calling NCI's Cancer Information Service at 1-800-4-CANCER, you and your doctor can get up-to-date breast cancer clinical trials information from NCI's ***PDQ®*** *computer database.*

Hormonal Therapy

Hormonal therapy is used to prevent the growth, spread, or recurrence of breast cancer. If lab tests show that your tumor depended on your natural hormones to grow, it will be described as estrogen-positive or progesterone-positive in the lab report. This means that any remaining cancer cells may continue to grow when these hormones are present in your body. Hormonal therapy can block your body's natural hormones from reaching any remaining cancer cells.

- You may be given a hormone drug. One of the most common drugs used for hormonal therapy for breast cancer is tamoxifen.
- You may have surgery to remove both ovaries that produce natural hormones.

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Research has proven that hormonal therapy can extend the lifespan of a breast cancer patient who has cancer cells that depend on hormones to grow. Tamoxifen has been used for nearly 20 years to treat patients with advanced stage breast cancer. Now it is being used also as additional treatment for early stage disease after breast cancer is removed by surgery. Clinical trials show that taking tamoxifen as part of the treatment for breast cancer helps to reduce the chances of recurrence in the treated breast and of new cancer developing in the other breast.

Tamoxifen is taken daily by mouth as a pill. Your oncologist will decide on the dose and length of treatment according to current research findings. Like chemotherapy, hormonal therapy affects cells throughout your body. Studies have shown that there is some increased risk for cancer of the uterus. Blood clots have been reported in the veins of a small percentage of patients who take tamoxifen along with chemotherapy. These risks, however, are much lower than the benefits received from tamoxifen.

Of course, you will have frequent blood tests and physical exams while you are on hormonal therapy. Be sure your gynecologist and primary care doctor know you are taking this drug. You should have yearly pelvic exams while taking tamoxifen, and you should notify your doctor about any unusual bleeding or pain.

Possible Problems: Side effects could include hot flashes, nausea, vaginal spotting (small amounts of blood), or increased fertility in younger women. Less common side effects include depression; vaginal itching, bleeding, or discharge; loss of appetite; eye problems; headache; and weight gain.

Questions To Ask Your Medical Oncologist About Hormonal Therapy

- *What benefit might I get from hormonal therapy?*
- *Which would be better for me, hormone medication or surgery to remove my ovaries? Why?*
- *What drug will I be taking? How will I know it is working?*
- *What are the side effects and how can I manage them?*
- *What side effects should I report to you?*
- *How long will I be on hormonal therapy?*
- *Will I need followup care?*
- *What if I don't have hormonal therapy?*

Biological Therapy (Immunotherapy)

Your own immune system is your body's natural defense against diseases, including cancer. Your immune system also defends your body against infections and other side effects of cancer treatment. A strong immune system detects the difference between healthy cells and cancer cells, and it can get rid of those that become cancer. The immune system can be strengthened and improved by new biological therapies. These treatments are designed to repair, stimulate, or increase your body's natural ability to fight infections and cancer.

Medical researchers are looking at many types of biological therapies that use and boost the substances produced naturally by the body's own cells. They are also creating new substances that can imitate or help the body's natural immune system to work against infection and disease. These are being used in clinical trials with chemotherapy and radiation therapy.

Possible Problems: Biological therapies may produce side effects such as rashes or swellings at the site where shots are given; flu-like symptoms, including fever, chills and fatigue; digestive tract problems; or allergic reactions.

More information about breast cancer treatment clinical trials that use biological therapies is available from NCI's Cancer Information Service at 1-800-4-CANCER.

Breast Reconstruction

Breast reconstruction (surgery to rebuild a breast's shape) is often an option after mastectomy. Some health insurance plans pay for all or part of the cost of breast reconstruction and, also, for surgery to the other breast so that both breasts are about the same shape and size.

Reconstruction will not give you back your breast. Although the reconstructed breast will not have natural sensation, the surgery can give you a result that looks like a breast. If you are thinking about reconstruction, you should talk with a plastic surgeon *before* your mastectomy. Ask your surgeon for a referral to an experienced plastic surgeon. Some women begin reconstruction at the same time as the mastectomy is done; others wait several months or even years.

Breast Implants

A plastic surgeon is able to form a breast mound by using an **implant** or by using tissues from another part of your body. Breast implants are **silicone** sacs filled with saline (salt water) or silicone gel. The sacs are placed under your skin behind your chest muscle. Your body type, age, and cancer treatment will determine which type of reconstruction will give you the best result.

Saline and Silicone Implants

Saline-filled breast implants are available for anyone who wants them.

Some scientists are concerned about possible short-term and long-term health problems associated with silicone gel-filled breast implants. The Food and Drug Administration (FDA) has decided that breast implants filled with

silicone gel may be used only in an FDA-approved clinical trial. Your surgeon can determine if you are eligible and can make arrangements for you to join the study.

Possible Problems: As with any surgery, you may have some pain, swelling, bruising, and tenderness. These problems should disappear as you recover. Scars will fade over time. You should let your doctor know immediately about any fever, infection, or bleeding.

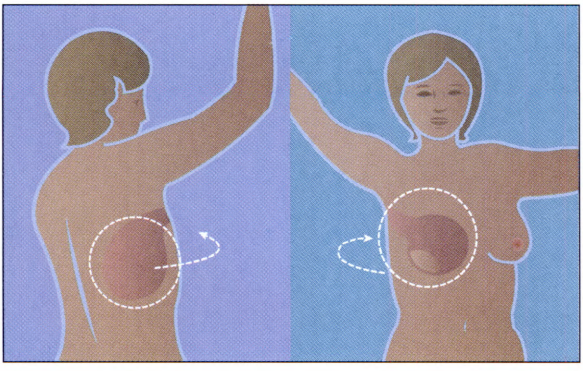
Side effects that could appear later include rupture, leakage, deflation or shifting of the implant, or interference with mammography readings. Breast implants age over time and may need to be replaced.

For More Information About Breast Implants:

- *Contact plastic surgeons and other medical experts.*
- *Call NCI's Cancer Information Service (CIS), 1-800-4-CANCER.*
- *Call the Food and Drug Administration (FDA), 1-800-532-4440.*
- *Call the American Cancer Society (ACS), 1-800-ACS-2345.*
- *Talk to breast cancer survivors who have had reconstruction.*
- *Contact your health insurance company.*

Reconstruction With Tissue Flaps

A flap (section) of skin, muscle, and fat can be moved from another part of the body to the chest area where it is formed to create a breast shape. This tissue can be taken from the lower abdomen, back, or buttocks.



Tissue Flap Reconstruction: *This flap of skin, muscle, and fat is moved while still connected to its blood supply. It is then shaped to form a new breast mound.*

Choose a plastic surgeon who has been trained in this procedure and has performed it successfully on many women. Of course, you will need to have regularly scheduled followup care and mammograms.

Possible Problems: **Tissue flap reconstruction** is a major operation, resulting in large surgical wounds. If there is a poor blood supply to the flap tissue, part or all of the tissue in the breast area may not survive the transplant. Infection and poor wound healing are possible problems.

What You Should Know

Most women who have breast reconstruction are happy with their decisions. A woman starting this process, however, should know that breast reconstruction requires more than one surgery. Extra steps may include:

- *Adding a nipple.*
- *Changing the shape or size of the reconstructed breast.*
- *Surgery on the opposite breast to create a good match.*

With most of these extra surgeries, you can go home the same day as the operation.

Questions To Ask Your Plastic Surgeon About Breast Reconstruction

- *What is the latest information about the safety of breast implants?*
- *How many breast reconstructions have you done?*
- *Which type of surgery would give me the best results?*
- *How long will the surgery take? What kind of anesthesia?*
- *When do you recommend I begin breast reconstruction?*
- *How many surgeries will I need?*
- *What are the risks at the time of surgery? Later?*
- *Will there be scars? Where? How large?*
- *Will flap surgery cause any permanent changes where tissue was removed?*
- *What complications should I report to you?*
- *How long will my recovery take? When can I return to my normal activities? What activities should I avoid?*
- *Will I need followup care?*
- *How much will it cost? Will my health insurance pay for breast reconstruction?*

Complementary Therapies

In addition to medical treatment, some cancer patients want to try complementary therapies. Complementary therapies include acupuncture, herbs, biofeedback, visualization, meditation, yoga, nutritional supplements, and vitamins. Some breast cancer patients feel that they benefit from some of these therapies.

Before you try any of these therapies, you should discuss their possible value and side effects with your medical doctors. You should let them know if you are using any such therapies. These therapies should never be used instead of medical treatment. Be aware that these therapies may be expensive and some are not paid for by health insurance. You should consider asking the therapist for evidence of how the therapy has helped others, possibly by giving you references.

Emotional Health

It is normal to have trouble coping with the diagnosis and treatment of breast cancer. Some women feel anger, fear, denial, frustration, loss of control, confusion, or grief. Others feel lonely, isolated, and depressed. Some breast cancer patients may be concerned about self-image, future priorities, sexuality, concerns about family members and medical bills, and possible death. Like other women, you can deal with these issues and your diagnosis of cancer in your own way and at your own pace.

You may want to talk with a friend or family member who can listen and let you sort out your feelings without giving any advice. When you reach out, you give loved ones and friends the chance to support you during this difficult time. You may want to talk about your concerns with members of your health care team. You will feel more confident and in control as you become comfortable with your treatment decisions.

Like other cancer survivors, you may experience an emotional letdown once treatment is completed. This could happen because you may feel that you should keep doing something to continue fighting your disease. Concerns and fears about breast cancer are likely to stay with you. A new ache or pain, or the anniversary of your diagnosis, may get you down or worried. Making appointments for followup exams, returning to a treatment location, and waiting for test results may be especially stressful. These feelings are part of being a cancer survivor. Having faced one of life's greatest challenges, you will find relief from these anxieties as you return to routine activities and focus on your future goals.

Many women are helped by talking about their feelings with other women who have had breast cancer. Hospitals often offer support groups or meetings with counselors or psychologists. Ask your doctor if your hospital offers these services. You also may want to look into family or individual therapy. Growing numbers of therapists offer services to individuals, families, and friends affected by cancer.

NCI's Cancer Information Service (1-800-4-CANCER) is available to you and your family for talking about concerns and finding breast cancer support services in your community. You can request written materials such as ***Taking Time: Support for People With Cancer and the People Who Care About Them*** *and* ***Facing Forward: A Guide for Cancer Survivors.***

Followup Care

After your breast cancer treatment is completed, you will need to have regularly scheduled followup care. Because you have had breast cancer in one breast, you are at increased risk of developing breast cancer again. To be sure that the cancer has not returned, your checkups will include physical exams and mammograms. You also may have blood tests, chest x-rays, bone scans, or other tests. If you find any unusual changes in your treated area or in your other breast, or if you have swollen lymph **glands** or bone pain, you should call your doctor as soon as possible.

Glossary

Alteration, altered: Change; different from original.

Abnormal: Not normal. May be cancerous or premalignant.

Anesthesia: Drugs or gases given before and during surgery so the patient won't feel pain. The patient may be awake or asleep.

Anesthesiologist: A doctor who gives drugs or gases that keep you comfortable during surgery.

Benign: Not malignant; does not invade nearby tissue or spread to other parts of the body.

Biological therapy: Treatment that uses the body's immune system to fight cancer or to lessen the side effects that may be caused by some cancer treatments. Also known as immunotherapy.

Biopsy: Removal of a sample of tissue that is then examined under a microscope to check for cancer cells.

Bone marrow: The soft material inside bones. Blood cells are produced in the bone marrow.

Breast cancer *in situ:* Very early or noninvasive abnormal cells that are confined to the ducts or lobules in the breast. Also known as DCIS or LCIS.

Cancer: A term for diseases in which abnormal cells divide without control or order. Cancer cells can invade nearby tissues and can spread through the bloodstream and lymphatic systems to other parts of the body.

Carcinoma: Cancer that begins in the lining or covering of an organ.

Cell: The smallest unit of tissues that make up any living thing. Cells have very specialized structure and function and are able to reproduce when needed.

Chemotherapy: Treatment with drugs to kill or slow the growth of cancer cells; also used to shrink tumors before surgery.

Clavicle: Collarbone.

Clear margins: An area of normal tissue that surrounds cancerous tissue, as seen during examination under a microscope.

Clinical trials: Research studies, where patients help scientist find the best way to prevent, detect, diagnose or treat diseases.

DCIS, ductal carcinoma *in situ* (intraductal carcinoma): Abnormal cells that involve only the lining of a milk duct.

Duct: A small channel in the breast through which milk passes from the lobes to the nipple.

Erythrocytes: Red blood cells that carry oxygen from the lungs to cells in all parts of the body, and carry carbon dioxide from the cells back to the lungs.

Estrogen: A female hormone; one of the hormones that can help some breast cancer tumors grow.

Estrogen receptor test: Lab test to determine if breast cancer depends on estrogen for growth.

Gene: The basic unit of heredity found in all cells of the body.

Glands: Lymph nodes.

Gynecologist: A doctor who specializes in the care and treatment of women's reproductive systems.

Hormonal therapy: The use of hormones to treat cancer patients by removing, blocking, or adding to the effects of a hormone on an organ or part of the body.

Hormone receptor tests: Lab tests that determine if a breast cancer depends on female hormones (estrogen and progesterone) for growth.

Hormones: Chemical substances in the body that affect the function of organs and tissues.

Immune system: The body's own natural defense system against infection or disease.

Implant: A silicone gel-filled or saline-filled sac inserted under the chest muscle to restore breast shape.

Infiltrating or **invasive breast cancer:** Cancer that has spread to nearby tissue, lymph nodes under the arm, or other parts of the body.

Intraductal carcinoma: Abnormal cells that are contained within the milk duct and have not spread outside the duct. Also known as DCIS (ductal carcinoma *in situ).*

Intravenous (IV): Injection into a vein.

LCIS, lobular carcinoma *in situ*: Abnormal cells in the lobules of the breast; a sign that a woman is at increased risk of developing breast cancer.

Leukocytes: White blood cells that defend the body against infections and other diseases.

Lobe, lobule: Located at the end of a breast duct, the part of the breast where milk is made. Each breast contains 15 to 20 sections, called lobes, each with many smaller lobules.

Lymphatic system: The system that removes wastes from body tissues and filters the fluids that help the body fight infection.

Lymph nodes: Small bean-shaped organs (sometimes called lymph glands); part of the lymphatic system. Lymph nodes under the arm drain fluid from the chest and arm. During surgery, some underarm lymph nodes are removed to help determine the stage of breast cancer.

Lymphedema: Swelling in the arm caused by fluid that can build up when underarm lymph nodes are removed during breast cancer surgery or damaged by radiation.

Malignant: Cancerous; capable of invading, spreading and destroying tissue.

Mammogram or **mammography:** X-ray picture of the breast.

Menopause: The time of life when a woman stops having monthly menstrual periods.

Metastasis or **metastatic:** Spread of cancer from the original part of the body to another. Cells that have metastasized are like those in the original (primary) tumor.

Microcalcifications: Tiny deposits of calcium that can be detected by mammography. A cluster of small specks of calcium may indicate that cancer is present.

Negative: A lab test result that is normal; failing to show a positive result for the specific disease or condition for which the test is being done.

Nutritionist or **dietitian:** A health professional with specialized training in nutrition, who can offer help and choices about the foods you eat.

Oncologist, medical oncologist, or **cancer specialist:** A doctor who uses chemotherapy or hormonal therapy to treat cancer.

Oncology nurse: A nurse with special training in caring for cancer patients.

Oncology pharmacy specialist: A person who prepares anticancer drugs in consultation with an oncologist.

Oncology social worker: See social worker.

Ovaries: The pair of female reproductive organs that produce eggs and hormones.

Pathologist: A doctor who examines tissues and cells under a microscope to determine if they are normal or abnormal.

Pathology report: Diagnosis made by a pathologist based on microscopic evidence.

PDQ: NCI's computer database that contains up-to-date cancer information for scientists, health professionals, patients, and the public.

Physical therapist: A health professional who teaches exercises that help restore arm and shoulder movement and build back strength after breast cancer surgery.

Plastic surgeon or **reconstructive surgeon:** A doctor who can surgically rebuild (reconstruct) a woman's breast.

Platelets: The part of a blood cell that helps prevent bleeding by causing blood clots to form at the site of an injury.

Positive: A lab test result that reveals the presence of a specific disease or condition for which the test is being done.

Primary care doctor: A doctor who ususally manages your health care and can discuss cancer treatment choices with you.

Progesterone: A female hormone; one of the hormones that can help some breast cancers grow.

Progesterone receptor test: Lab test to determine if a breast cancer depends on progesterone for growth.

Prosthesis: An artificial replacement of a part of the body. A breast prosthesis is a breast form that may be worn under clothing. Also, a technical name for an implant that is placed under the chest muscle in breast reconstruction.

Psychologist: A specialist who can talk with you and your family about emotional and personal matters, and can help you make decisions.

Radiation oncologist: A doctor who uses radiation therapy to treat cancer.

Radiation therapist: A health professional who gives radiation treatment.

Radiation or **radiation therapy:** Treatment with high-energy x-rays to kill cancer cells. Radiation can be used in low doses to diagnose breast cancer and in high doses to treat breast cancer.

Radiologist: A doctor with special training in reading x-rays and performing specialized x-ray procedures.

Risk factor: A condition that increases a person's chances of getting a disease.

Sentinel lymph node: The first lymph node(s) to which cancer cells spread after leaving the area of the primary tumor. Presence of cancer cells in this node alerts the doctor that the tumor has spread to the lymphatic system.

Silicone: A synthetic gel that is used as an outer coating on breast implants and to make up the inside filling of some implants.

Social worker: A professional who can talk with you and your family about your emotional or physical needs and can help you find support services.

Stage, or **staging:** Classification of breast cancer according to its size and extent of spread.

Standard: Usual, common, customary.

Stem cell: The immature cells in blood and bone marrow from which all mature blood cells develop.

Surgeon or **surgical oncologist:** A doctor who performs biopsies and other surgical procedures such as removing a lump or a breast.

Surgery: An operation.

Therapy: Treatment.

Tissue: A group or layer of cells that together perform a specific function.

Tissue flap reconstruction: A flap of tissues is surgically relocated from another area of the body to the chest, and formed into a new breast mound.

Tumor: An abnormal growth of tissue. Tumors may be either benign (not cancer) or malignant (cancer).

X-ray: A high-energy form of radiation; used in low doses for diagnosing diseases and in high doses to treat cancer.

Other Booklets

This booklet is a starting point to help you understand your breast cancer diagnosis and treatment options. Your own doctors and nurses are the best sources for answers to your questions. As noted throughout this booklet, the National Cancer Institute's Cancer Information Service (CIS) can provide the latest cancer information and help you find breast cancer support groups in your community.

You may request the following NCI booklets by calling 1-800-4-CANCER:

- *Understanding Breast Changes: A Health Guide for All Women*
- *What You Need To Know About Breast Cancer*
- *Chemotherapy and You: A Guide to Self-Help During Treatment*
- *Helping Yourself During Chemotherapy: 4 Steps for Patients*
- *Radiation and You: A Guide to Self-Help During Treatment*
- *Get Relief From Cancer Pain*
- *Managing Cancer Pain*
- *Questions and Answers About Pain Control*

- *Taking Part in Clinical Trials: What Cancer Patients Need To Know*
- *What You Need To Know About Cancer*
- *Eating Hints For Cancer Patients*
- *Taking Time: Support for People With Cancer and the People Who Care for Them*
- *Facing Forward: A Guide for Cancer Survivors*
- *When Cancer Recurs: Meeting the Challenge Again*
- *Advanced Cancer*
- *Genetic Testing for Breast Cancer Risk: It's Your Choice*
- *Understanding Gene Testing*
- *El tratamiento de radioterapia: Guía para el paciente durante el tratamiento (Radiation Therapy: a Guide for Patients During Treatment)*
- *¿En qué consisten los estudios clínicos? Un folleto para los pacientes de cáncer (What Are Clinical Trials All About? A Guide for Cancer Patients)*
- *Datos sobre el tratamiento de quimioterapia contra el cáncer (Facts About Chemotherapy)*

Resources

by telephone...

Cancer Information Service (CIS)

A free public service of the National Cancer Institute, the CIS answers cancer-related questions in English and Spanish and distributes NCI materials to patients, the public, and health professionals.

Toll-free: 1-800-4-CANCER (1-800-422-6237)

TTY: 1-800-332-8615

by Internet...

NCI's main homepage at **http://www.nci.nih.gov** contains information about the Institute and its programs. The specific sites of particular interest to the public, media, and health professionals are:

http://rex.nci.nih.gov

news, educational materials, and tutorials expecially for patients, public, and the mass media

http://cancernet.nci.nih.gov

CancerNet™, or **PDQ®**, NCI's computerized database for the latest information on cancer treatment, supportive care, screening, prevention, and clinical trials

http://cancertrials.nci.nih.gov

NCI's online clinical trials resource center

by e-mail...

CancerMail

To obtain a contents list, send e-mail to **cancermail@icicc.nci.nih.gov** with the word "help" in the body of the message.

by fax...

CancerFax® fax on demand service. Dial 301-402-5874 and listen to recorded instructions.

Notes

Attention All Readers—

Please tell us what you think about this booklet.

1. *The booklet was:* ❑ *easy to understand* ❑ *hard to understand*
2. *The information was:* ❑ *too much* ❑ *too little* ❑ *just the right amount*
3. *More information should have been given about:* _____
4. *Less information should have been given about:* _____
5. ❑ *I would recommend this booklet to another person.*
   ❑ *I would not recommend this booklet to another person.*
6. *I received this booklet from:*
   - ❑ *a doctor, a nurse or other health professional*
   - ❑ *an information rack at a clinic, hospital, doctor's office*
   - ❑ *the National Cancer Institute's Cancer Information Service at 1-800-4-CANCER*
   - ❑ *a family member or friend*
   - ❑ *other (please explain):* _____
7. *I am:* ❑ *a breast cancer patient* ❑ *a family member or friend*
   ❑ *a health professional* ❑ *other:* _____
8. *My age is:* ____
9. *This booklet helped me:*

a) get the information that I needed.	❑ *yes*	❑ *no*
b) understand a breast cancer diagnosis.	❑ *yes*	❑ *no*
c) make treatment decisions.	❑ *yes*	❑ *no*
d) communicate with my health care providers.	❑ *yes*	❑ *no*
e) find more information or support in my community.	❑ *yes*	❑ *no*

10. *This booklet should be:* ❑ *continued* ❑ *revised* ❑ *discontinued*

Your comments are appreciated!

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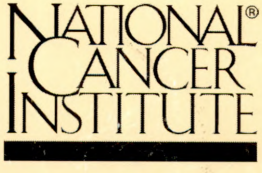
The National Cancer Institute (NCI) is the lead Federal agency for cancer research. Since Congress passed the National Cancer Act in 1971, NCI has continued to collaborate with top researchers and medical facilities across the country to conduct innovative research leading to progress in cancer prevention, detection, diagnosis, and treatment. These efforts have resulted in a recent decrease in the overall cancer death rate, and have helped improve and extend the lives of millions of Americans.



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